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Therefore, by (10) and any of the well-known tables giving the values of P and κ which satisfy equation (8), we obtain the following figures showing the limits (as $c \doteq \infty$ and $\alpha/c \doteq 1$) of the possible error incurred by taking $P = (P_1 + P_0)/2$.

P	κ^2	ψ	$(P_1 - P_0)/2P_0$
.01	2.72	.101	.056
.001	4.80	.032	.017
.0001	6.92	.016	.008

The short table which follows gives some of the pairs of values of c and α satisfying the three equations $P = .01$, $P = .001$ and $P = .0001$ for the limiting case of $p \doteq 0$, $n \doteq \infty$.

c	$P = .0001$		$P = .001$		$P = .01$	
	α	α/c	α	α/c	α	α/c
1	.0001	.0001	.0010	.001	.010	.010
2	.0142	.0071	.0454	.023	.149	.075
3	.0862	.0289	.191	.064	.436	.145
4	.232	.0580	.429	.107	.823	.206
5	.444	.0888	.739	.148	1.28	.256
6	.714	.119	1.11	.185	1.79	.298
7	1.03	.147	1.52	.217	2.33	.333
8	1.39	.174	1.97	.246	2.91	.364
9	1.78	.198	2.45	.272	3.51	.390
10	2.20	.220	2.96	.296	4.13	.413
12	3.11	.259	4.04	.337	5.43	.452
14	4.11	.293	5.20	.371	6.78	.484
16	5.17	.323	6.41	.401	8.18	.512
18	6.28	.349	7.66	.426	9.62	.534
20	7.44	.372	8.96	.448	11.1	.555
30	13.7	.457	15.9	.530	18.7	.623
40	20.6	.515	23.3	.582	26.8	.670
60	35.4	.590	38.0	.648	43.5	.725
80	50.9	.636	55.2	.690	60.7	.759
100	67.0	.670	71.9	.719	78.2	.782
140	100.2	.716	106.3	.760	114.0	.814
180	134.3	.746	141.4	.786	150.3	.835
200	151.6	.758	159	.795	169	.845
300	240	.800	249	.830	261	.870
400	330	.825	341	.852	355	.887
500	421	.842	434	.868	450	.900
600	513	.855	527	.878	545	.908
700	606	.866	621	.887	640	.914
800	699	.874	715	.894	736	.920
900	793	.881	810	.900	832	.924
1000	887	.887	905	.905	928	.928

BOOK REVIEWS.

W. H. BUSSEY, Chairman of the Committee.

Academic Algebra. By GEORGE WENTWORTH and DAVID EUGENE SMITH.
Ginn & Co., Boston, 1913. iv + 442 pages. \$1.20.

This book is the second of the Wentworth-Smith series. In it the authors have attempted to provide a high school course which shall cover the topics

named in the various curricula suggested by educational associations. The topics considered valuable but not essential are placed in an appendix. More than this, the authors have sought, by means of the practical problems, to give proper preparation to those who are fitting themselves for a trade. The noteworthy features of the book are the early and simple introduction of graphs with a table of squares and cubes at the end of the book to facilitate computation, the large number of oral problems under each topic and the cumulative reviews at the end of the book. There is also a very brief history of Algebra.

R. R. SHUMWAY.

Higher Algebra. By HERBERT E. HAWKES. Ginn and Company, Boston, 1913. vi + 222 pages. \$1.25.

This algebra is an admirable rearrangement and revision of selected chapters from the *Advanced Algebra* published by the same author eight years ago. Pedagogically and typographically the book marks a distinct advance over the earlier work.

As a relatively large number of texts are upon the market dealing with high-school algebra and as more bid fair to appear, it would be highly desirable for the publishers to agree upon a somewhat precise definition of the terms, higher algebra, advanced algebra, college algebra, elementary algebra, and algebra. Our terminology, unfortunately somewhat fixed, seems distinctly inferior to that employed in Europe. A foreign mathematician who chances upon an American "higher algebra" with the content of this one would doubtless be led to inquire into the nature of our "lower algebra." On the other hand, the appearance of our books is decidedly superior, though even this is not an unmixed blessing, for the complete explanations accompanied by numerous diagrams bear mute witness to the fact that many high school teachers require all this paraphernalia to present the subject. Even with the best teachers such complete texts as our American publishers and authors are presenting have their disadvantages, for the pupil is encouraged to believe that the teacher's explanation is of secondary importance. A desirable innovation for test purposes would be a text-book on algebra consisting only of a few formulas, possibly those commonly put in heavy type, together with long sets of exercises. Pupils would be compelled to attend closely to class demonstrations and the teacher would become something more than a commentator.

Eleven chapters are included in this work together with four-place logarithms and tables for the extraction of square and cube roots. The chapter headings are as follows: Introductory review, functions and their graphs, quadratic equations, inequalities, complex numbers, theory of equations, permutations, combinations, and probability, determinants, partial fractions, logarithms, infinite series.

Only minor points would seem to require criticism. The paragraph, page 48, on the "reduced form" $x^2 + px + q = 0$ of the quadratic $ax^2 + bx + c = 0$ seems unnecessary and undesirable. Furthermore, "reduce" is twice used in the introductory discussion of this passage in a different sense from that of the